



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁴ : H04N 7/16, H04K 1/04	A1	(11) International Publication Number: WO 85/03830 (43) International Publication Date: 29 August 1985 (29.08.85)
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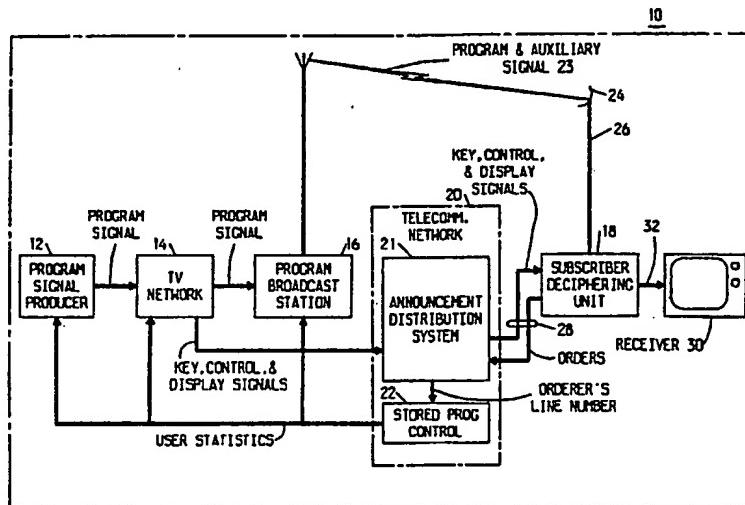
(21) International Application Number: PCT/US85/00132 (22) International Filing Date: 25 January 1985 (25.01.85) (31) Priority Application Number: 582,966 (32) Priority Date: 23 February 1984 (23.02.84) (33) Priority Country: US	(81) Designated States: DE, GB, JP, KR, NL, SE. Published <i>With international search report.</i>
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(54) Title: METHOD AND APPARATUS FOR SUBSCRIPTION BROADCAST



(57) Abstract

The system (10) provides a way of utilizing announcement distribution service equipment (21) which is presently in use in telecommunications networks (20) for ordering television or other signals (23) on a per program basis. The program signals (23) are enciphered. The receiver (30) is connected to receive a deciphered signal from a subscriber deciphering unit (18) at a subscriber location. The subscriber unit (18) is connected to the telecommunications network (20) by a nondedicated telephone service line (28). In response to an order instruction by the subscriber, the unit (18) automatically calls the appropriate announcement distribution service number for the channel associated with the desired program signals and receives from the service the coded key information (58) necessary for it to decipher the program signal. When the program signal is received by the unit (18), it is accompanied by control signals during retrace intervals which activate deciphering circuitry (G) in the unit. Also disclosed is a method of operation for the system (10) and a subscriber deciphering unit (18) for use in the system (10).

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METHOD AND APPARATUS FOR SUBSCRIPTION BROADCAST

Technical Field

The invention relates to the distribution of signals, particularly radio or television signals, in such a way that there is control over their use, such as is the case for so-called "pay television."

While commercially broadcast television signals have generally been available to whomever wishes to receive them, there are other signals which are made available only to members of a restricted subscriber group. Sometimes the subscriber has a choice of ordering or not ordering a particular signal for a given time period. If he does order and he receives it, he becomes a "user."

Although there may be a number of variations in systems for distributing a signal on a per program basis, the following description applies to a typical system. The program signal is generated by a program "producer" entity and transferred to a distributor, which offers it to subscribers via cable on an order basis. The program signal is enciphered. Control of its use is afforded by controlling the availability of a key for its deciphering. The subscriber is supplied with a subscriber unit which incorporates the deciphering equipment and deciphers the signal of a selected channel for the receiving equipment. The subscriber unit may also require the delivery of deciphering key information before it can perform the deciphering.

The ordering of the program signal by a subscriber may be on an annual, monthly or shorter term basis. It may also be on a "per program" basis. A control unit at a remote location can supply the subscriber unit with a deciphering key for specific ordered programs. Systems of this type are described, for example, in the following U. S. patents:

4,008,369 issued February 15, 1977 to
D. L. Theurer et al. U. S. C. 358/8

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4,115,807 issued September 19, 1978 to

H. G. Pires U. S. Cl. 358/122

4,325,078 issued April 13, 1982 to

J. C. Seaton et al. U. S. Cl. 358/117

5 4,358,201 issued October 12, 1982 to

C. Sechet et al. U. S. Class 358/122

4,369,462 issued January 18, 1983 to

S. A. Tomizawa et al. U. S. Class 358/124

The collection of user statistics, i.e. the number
10 of orders for a program and the identities or the orderers
for billing purposes, presents some difficulties with
present subscriber systems. If the billing is not done
frequently enough, the number of uncollectible subscriber
accounts may become unacceptably high. On the other hand,
15 if the billing is done too often, the cost of mailing the
bills becomes excessive. For billing and other purposes,
it would be desirable to have an indication of the actual
number of users for a given program.

Signal theft is another difficulty with present
20 subscriber systems. It is often possible for either
subscribers who have not ordered a program signal or for
nonsubscribers with access to the enciphered signal to find
a way to decipher the signal independently or to
fraudulently cause the control unit to supply the
25 deciphering key to the subscriber unit. This cannot
normally be detected and is at the present time thought to
be a relatively wide-spread and persistent problem.

Another problem with present per program
subscriber systems is their inability to provide the
30 program producers with an independent means of measuring
the audience sizes for those programs in which they have a
financial interest.

The final, and perhaps most significant problem
with per program ordering systems is that arising from
35 impulse buying. It appears to be in the human nature of
subscribers to decide shortly before a program offering to
order the program signal. This is likely to completely

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overwhelm the equipment for accepting and recording program orders where the offered program is of great interest to a large number of subscribers. The capacity of the order-taking equipment then becomes a constraint on the sales of
5 the program signal.

Summary of the Invention

In accordance with the novel method and apparatus of the present invention, a program signal desired by a subscriber is automatically ordered by a subscriber unit
10 which has received an order command as a result of the subscriber operating an order switch on the unit. The ordering is done over a telephone line. In response to the order, the subscriber unit receives key deciphering information over the same telephone line and stores it in a
15 memory. The ordered enciphered program signal carries with it auxiliary signals including a control signal which activates the deciphering means in the unit to use the key information for deciphering the signal for the duration of the program. The subscriber unit in accordance with the
20 invention includes means for automatically placing a program order over a telephone line and means for storing deciphering key information received over the telephone line in response to the order. It also includes means responsive to control signals accompanying a program signal
25 for activating the means for deciphering the program signal. The unit may further be provided with a display for other information which is supplied with the key information or by the auxiliary signal.

Brief Description of the Drawings

30 FIG. 1 is a partially pictorial flow chart illustrating the interaction of various elements of a per program subscription system in accordance with a preferred embodiment of the present invention.

35 FIG. 2 is a front, elevational, perspective view of one embodiment of a subscriber unit of the system of FIG. 1 for deciphering the program signal for use by receiver equipment with which it is associated.

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FIG. 3 is a rear, elevational perspective view of the subscriber unit of FIG. 2.

FIG. 4 is a schematic graphical representation of the information content of a deciphering key which is 5 transmitted to the subscriber unit of FIGs. 1-3 in response to an order.

FIG. 5 is an exaggerated graphical representation of the frequencies of orders placed as compared to the orders served for program signals of the system of FIG. 1.

10 FIG. 6 is a functional block circuit diagram of the subscriber unit of FIGs. 2 and 3.

Detailed Description

One example of a system in accordance with the present invention is the per program television subscription system 10 shown in FIG. 1 of the drawings. In 15 the system 10, a program producer 12, a TV network 14, a broadcast station 16, and a program signal deciphering and control subscriber unit 18 are all interconnected by means of a telecommunications network 20. The telecommunications 20 network 20 features an announcement distribution system 21, a feature which is now commonly identified as a "900 Service" because at the present time in the United States any access to the service is most likely to require dialing "900" as the first three digits of the telephone number 25 which is identified with the particular announcement service in question. The announcement distribution system 21 is controlled by a stored program control system 22. The apparatus required for providing such a service in a telephone network, as well as the details of its 30 operation, are well known in the art of telephony and are described, for example, in the Bell System Technical Journal, July-August 1981, Vol. 60, no. 6, part 2. An announcement distribution system of this type has the capability of accepting a large number of incoming order 35 calls for various announcement services and automatically responding to the individual calls with a predetermined message.

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In current "900 Service" applications, it is most frequently the case that the message to be delivered to the callers is not stored in any equipment of the telephone company, but rather is provided directly from the premises 5 of the message creator. The telephone company equipment rather creates as many copies of the message signal as are needed to satisfy the instant number of callers who wish to receive the message. By virtue of this direct 1-to-N message delivery system, the message creator has complete 10 control over the message signal and can, for example, supply repetitions of a brief message or a continuous live program. This message may be in the form of a voice announcement or data information.

The same announcement system also includes means 15 for generating user statistics, such as by recording the number of orders and the types of orders as they are received, and also includes a billing system for automatically correlating the order calls with the identity of the telephone service lines which were used for making 20 the order call. This permits the charge for the service to be billed in the same manner as the billing for the telephone service, and in some cases means that the charge for the announcement order may be added as an item to the telephone service bill. Because such procedures are 25 presently well known and widely used, they will not be discussed in further detail herein, except with regard to advantages that may accrue as a result of their function within the system 10.

The interconnections of the program producer 12, 30 the TV network 14, the broadcast station 16, and the subscriber unit 18 by the telecommunications network 20 are accomplished by any of the commonly used signal carrier media, or combinations thereof, which are suitable for the type of signal carried. Communications carriers presently 35 provide a wide range of services appropriate for connections between producers, television networks, and broadcast stations. They also provide a telephone service

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line, usually in the form of metal wire, to subscribers who have telephone service. Therefore, the nature of the interconnection equipment to be used in conjunction with this invention will also not be discussed in detail herein except with regard to advantages that may accrue as a result of their function within the system 10.

The producer 12 is assumed to be the original source of the signal which is to be offered as a program signal for viewing by subscribers on their own receiving equipment. The program signal from the producer 12 is forwarded to the network entity 14, which determines further distribution of it to various broadcast stations which are geographically distributed to permit wide dissemination of the program signal. The broadcast stations 16 send the program signal to the subscriber unit 18 of each subscriber by airwaves, cable (CATV), direct broadcast satellite (DBS), or some other suitable program signal carrier. In the system 10 of FIG. 1, the program signal carrier is represented by electromagnetic radiation 20 23. It is picked up at the subscriber location by an antenna 24 and carried to the subscriber unit 18 by leads 26. In some applications, such as in DBS or CATV, there may be signal conversion equipment, filters, amplifiers, or such between the antenna 24 and the subscriber unit 18, 25 with appropriate leads 26 connecting such devices. The subscriber unit 18 may be receiving several different program signals associated with different frequency channels. One or more of these signals may be in enciphered form, while others may not be enciphered and may 30 therefore be available to the general public without charge.

The subscriber unit 18 is connected to the communications carrier network 20 by telephone lines 28. These lines 28 do not need to be dedicated lines. That is, 35 they need not be used exclusively for the functioning of the subscriber unit 18, but rather may be the common telephone service lines of a typical residence with only

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one telephone service. This is a particularly important aspect of the invention, since the telephone company's knowledge of the subscriber's telephone line number permits proper billing without the necessity of identifying the 5 subscriber unit 18 itself.

The subscriber unit 18 is connected to the television receiver 30 of the subscriber by signal leads 32.

It is a feature of the system 10 that the program 10 signals transmitted by the program signal carrier 23 are accompanied by auxiliary signals carried within the retrace interval of the signal. Techniques for carrying information within the retrace interval of a television signal are well known in the television broadcast art. The 15 auxiliary signals include control and display signals in the form of low speed digital information.

FIGS. 2 and 3 show the subscriber unit 18 of FIG. 1 in greater detail. FIG. 2 shows the front of the unit 18. On the extreme left there is located an on-off 20 power switch 36 which may control the power to the subscriber unit 18 alone or also control the power to the receiver 34. To the right of the switch 36 there is an order call button 38 by which the subscriber can command the unit 18 to order a desired program. Next to this is a 25 channel selection switch 40. A rectangular electronic alphanumeric display panel 42 is provided for displaying program and ordering information. On one side of the unit 18 is a mechanical lock 44 by which the unit 18 may be disabled to prevent unauthorized use.

30 FIG. 3 shows the back of the unit 18 with various electrical connection means including program signal output terminals 46 by which the program signal passes to the receiver 34, program signal input terminals 48 by which the signals picked up by the antenna 24 are received through 35 the leads 26, an auxiliary power receptable 50 by which the receiving equipment power can be controlled by the unit 18, a power input plug 52 by which line power is supplied to

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the unit 18, and a pair of telephone jacks 54, 56. The jack 56 is suited for an extension telephone. The jack 54 is coupled directly to a telephone service.

In the operation of system 10, it is first assumed
5 that the unit 18 is supplied with power. The auxiliary signals will supply program information which will appear on the display 42 to advise the subscriber as to the availability and time of an offered program. It may also give the cost to the subscriber. In order for this
10 information to appear on the display 42, however, it is necessary that the channel selection switch 40 be in the position for receiving the signal channel associated with the offered program. Each of the available channels may have such display information provided with its program
15 signals, so that this display information may be selected by the subscriber as desired by appropriate positioning of the channel selection switch 40.

If the subscriber wishes to order a program being offered, he need only operate the order call button 38
20 within the time period specified by the displayed information. This will initiate an order sequence within the unit 18 by which there will subsequently be an automatic call to the announcement distribution system 21 of the telecommunications network 20. The call will be
25 triggered by an appropriate control message provided in the auxiliary signal. The announcement distribution system 21 will recognize from the telephone number which was called by the unit 18 that this call requires a particular order response. It will then make that response by automatically
30 connecting the call from the unit 18 to an announcement in the form of a low speed voiceband data signal which contains a deciphering key.

An example of a deciphering key is shown schematically in FIG. 4. It consists of a continuously
35 repeated data message 58 which is 3 seconds long. The length is chosen for compatibility with the prevailing telecommunications network standards for validating the

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call. The key information is in the form of a number of
digitally encoded numerical values which can be used to set
the coefficients of a signal filter. It is noted that
since the amount of information ordinarily needed for
5 deciphering can be transmitted within only a fraction of
the three second interval, there remains a considerable
amount of time which may be used to transmit other
information to the unit 18. This may be display
information or operational control information for the unit
10 18 similar to that contained in the auxiliary signal.

As the unit 18 receives the deciphering key
information, it stores the key within a memory associated
with the selected program channel. Now the unit 18 is
prepared to decipher the program signal on command at the
15 time it is delivered to the unit 18. At the start of the
program, the control signals which are in the auxiliary
signal delivered with the program will instruct the
deciphering circuitry to become active. The activating
instructions will continue throughout the program. A later
20 program will have a different enciphering format and will
therefore require a different key. Thus, although the
later program also carries with it the control signals for
activating the deciphering circuitry, this will be
insufficient for the deciphering process, since the unit 18
25 will not have in its memory the key information necessary
for the deciphering.

There are a large number of enciphering methods
known in the art which would readily lend themselves to the
system 10. The particular one chosen depends upon the
30 chosen complexity of the unit 18 and the enciphering
equipment, as well as upon the nature of the particular
signal to be transmitted. The preferred type of
enciphering for use with the system 10 is one in which a
digitally encoded key can be used to correctly set the
35 coefficients of a deciphering circuit signal filter in the
unit 18 for deciphering. Various enciphering techniques of
this type are known to those in the art of enciphering

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television signals and can be readily adapted by them for the system 10. Therefore, the structural details of the deciphering circuitry necessary for this are not discussed in detail here.

5 The order calling apparatus of the unit 18 includes a memory in which an order call instruction from the subscriber is held until such time as the unit 18 receives a proper deciphering key when it calls the announcement distribution system. Any other call result, 10 such as a busy signal, will cause the unit 18 to retain the order call instruction in memory. It is further provided with means responsive to the control signals of the auxiliary signals carried with the program signal by which its call initiation is determined to be within a particular 15 time period as determined by overload sensing equipment of the announcement distribution system. These features, described below, are especially advantageous for situations in which there is a high degree of impulse ordering.

FIG. 5 illustrates graphically the problems which 20 arise with impulse ordering of program signals. The baseline 60 represents the passage of time about the beginning time of the program signal. The ordinate represents the number of order events. Curve 62 shows the 25 number of orders requested over time by subscribers who have operated the order call switch 38 on their units 18. Curve 64, on the other hand, shows the number of orders to which the announcement distribution system has been able to respond. It is seen that within the short interval between the end of a normal broadcast and the beginning of the 30 ordered program signal there is an overload condition of the announcement distribution system. As discussed above, the unit 18 will continue to attempt to place the order if it encounters a busy signal in such an overload condition. However, the end result may be that in a severe overload 35 situation the deciphering key information is not delivered by the time the program is to begin. This would leave the subscriber as having been billed for the program in its

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entirety while not being able to decipher it from its beginning point. In order to avoid such a state of affairs, the program signal can be initially transmitted with a first enciphering. Appropriate control signals delivered by auxiliary signals transmitted with it will enable any subscriber unit 18 to decipher the program signal by the use of deciphering key information which is already available to the unit 18, either by being hardwired within it, by being delivered at an earlier time, or by being delivered coincidentally with the control signal to switch to this first deciphering state. This deciphering state of the unit 18 will be referred to as the "internal key" state. The low speed data and control content of the auxiliary signal can also be used to put the unit 18 into a state in which the deciphering circuitry is not utilized, such as when the program signal is not enciphered because it is intended to be available to the general public. This will be referred to as the "bypass" state.

The probability of overloading of the order receiving equipment can be reduced by controlling the order calling of the subscriber units 18 in groups. The groups would be determined by internal identifiers. For example, the low speed data and control signals accompanying the program signal can include order call activation commands for the units in three different formats which are sufficiently spaced in time to accommodate the order demand which is expected for the program. The units would be provided with corresponding filters by groups, so that a given call activation command will activate only that group which has a pass-filter for that signal. The others would remain in a standby condition until activated by their respective control signals. In this manner, the order taking capacity of the system is most effectively used. Furthermore, the time period allotted for the order calling of the groups of units 18 can be adjusted as needed as the orders are taken, due to the availability of the user statistics kept by the stored program control system 22.

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There are, then, three signal receiving states of the unit 18. The first is the bypass state, in which the deciphering circuitry is inactive and the program signal is transmitted unaltered to the receiver 34. The second is 5 the internal key state, in which the unit 18 deciphers the enciphered program signal with the use of internally available deciphering key information. As described above, this state can be used if the order call button 38 has been operated and the key information has not been delivered by 10 the time the program has started. The third is the ordered key state, in which the program signal is deciphered using key information delivered in response to an order call for that program.

FIG. 6 is a partially pictorial functional block 15 diagram of the subscriber unit 18. The subunits A-L illustrated on the left side of the unit are largely concerned with the reception and deciphering of the television signal, while the subunits N-Z on the right side are largely concerned with the telephone connection and the 20 reception and processing of the deciphering key and related messages. The functional details of the subunits can be readily supplied by those skilled in the art.

Power is delivered throughout by a power supply 25 subunit A under the control of the switch 36. Subunits B, C and D provide standard television receiver functions of tuning, IF and Video amplification, and automatic gain control. Subunit B is an electronic tuner; it receives channel changes indirectly via controller M, rather than directly from the channel selector 40, as would be the case 30 with a mechanical tuner.

The receiver subunit E takes the output of the amplifier C and extracts auxiliary signals from those retrace interval lines which have subscription television header signals. These auxiliary signals are formated into 35 control messages and then output to the message buffer J for use by the controller subunit M.

The control message receiver E reports message

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format and parity errors to the weak station detector F, which measures both the AGC output level and the message error rate to determine if a weak station condition must be reported to the controller M.

5 It is the principal function of the tuner B and the amplifier C to prepare the television signal as it appears at input 48 for deciphering circuitry in the form of a descrambler G. The descrambler G has two sets of input leads controlling its operation: first, those from
10 the state control switches as set by subunit K; and second, the deciphering key inputs as delivered by the key delivery subunit L. The circuits within descrambler G are set to either bypass or use the descrambling logic upon command from the state control switch K. The descrambler G resets
15 to the bypass state whenever it is not receiving power from subunit A.

The deciphering key is delivered to the descrambler G to cause it to operate in the proper mode and with the proper timing for deciphering the television
20 signal. The deciphered signal is delivered to the RF modulator subunit H for conversion to a proper signal for use by the subscriber's television receiver 30. An adjustment 47 is provided for the subunit H to set the output channel, typically to VHF channel 3 or 4. A portion
25 of the deciphered signal is also delivered to an optional subunit I, which separates and amplifies stereo sound output signals and delivers those signals to the optional ports 57 and 58 for connection into the subscriber's sound system. In addition, the descrambler G output is in part
30 delivered to the control message receiver E for purposes of receiving enciphered control messages and thereby testing the performance of the descrambler G.

The controller M receives signals of changes of condition within unit 18, and then responds by taking the
35 appropriate action as determined by its associated programs. For example, the controller M may be alerted to an arriving message by subunit J; that message may be a

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"display text" message. Controller M will then use its display programs to convert the message data to display data for output to the display driver subunit N. The display driver N then creates the appropriate text on the 5 external display panel 42 and also on the auxiliary data output port 43.

The controller M notes the position of lock 44 whenever the subscriber activates the order call button 38 or the channel select switch 40. Lock 44 can thus be used 10 to prevent the ordering of any program signals, i.e., the unit 18 must be "unlocked" to allow program signals to be ordered. Similarly, lock 44 can be used to enable or disable program viewing on certain program channels. The subscriber enables the desired channels by placing lock 44 15 in a "channel enable" position and using the channel selection switch 40. Controller M will cause the display 42 to indicate the channel numbers and their enabled/disabled state in response to the subscriber selections.

20 The switchhook controller and detector P and the digit output subunit 0 provide the autodialer function for the unit 18. Subunit P determines and controls the busy/idle state of the subscriber's telephone line to allow unit 18 to place telephone calls without interrupting 25 normal telephone usage. Subunit 0 transmits the digits of the telephone number desired.

The data carrier detector Q, the key and message buffer R, and the key and message receiver S together create the receive portion of a low-speed data modem. The 30 controller M, after placing a call for a deciphering key, will await a signal from data carrier detector Q indicating that the call indeed did reach the intended destination. If that signal is not received within the proper time interval as set by a control message and timed by the clock 35 subunit T, then the controller M will abandon the call attempt. If the call is completed, then the controller M will await the key and other messages to be delivered via

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subunits S and R. Should subunit S not receive an appropriate key signal, then the controller M will again consider the call to be incomplete.

The controller M, the memory W, and the clock T
5 are preferably supplied with back-up (battery) power V:
Back-up power is supplied to the controller M via a power
test subunit U which alerts the controller of low battery
condition. Power to restore the battery is delivered from
subunit A when the unit 18 is ON, and from subunit P when
10 it is OFF.

The memory subunit W provides both RAM and ROM
functions. The program subunit X contains the programs and
permanent data, such as a unit serial number, needed for
operations of unit 18. The shared data subunit Y stores
15 transient data such as switchhook busy/idle state, which
can be considered as shared by any and all program
channels. This is to be contrasted with the data stored in
the partitioned memory area Z, such as the telephone number
to be called to subscribe to a forthcoming program.
20 Controller M assigns areas within memory Z based on the
appearance of control messages in message buffer J whenever
a channel selector 40 change is made by the subscriber.
All data pertaining to orders for programs is kept
segregated by channel within memory Z.

25 Preferably, each channel that is enabled and
transmitting a control signal is allocated a section of the
memory Z by the unit 18 when it notes the presence of both
the enabling and the control signals. There is no cross
access within memory Z between broadcasting stations.
30 Moreover, each channel has memory in areas accessible only
to commands received in the auxiliary signal or via the
telephone line, respectively.

General Considerations

35 The key information which is delivered via the
telephone may itself be enciphered. This might be done by,
for example, disguising the key data within a much longer

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data signal that is largely chaff, using some numerical substitution scheme, or using any arithmetic operation that is reversible. The key would be deciphered or simply sorted from the chaff by using other data available to the
5 descrambler G before or during the ordered program. Such data might be any of:

- (1) data sent in the control signal coincident with the key data (a "good/bad" control pattern matching or other deciphering signal);
10
- (2) data as in (1), but sent via control signal at an earlier or later time;
- (3) data permanently stored in the box (such as a protected identifying number, where
15 "protected" means not known to the subscriber);
- (4) data sent earlier or later via telephone in the same or different telephone call, such as for a down payment/final payment scheme, or
20 for a discount plan for heavy users; or,
- (5) some combination of these methods.

A major advantage of this system is the ability of each television network to create a desired variation of key delivery scheme using techniques such as described here.

25 This is possible because each network supplies its own control signals and telephone signals and can use these signals to specify the sequences of operations performed by the descrambler G in real time.

This system can be of advantage also to networks
30 which choose not to broadcast their programs on a pay basis. These networks can still display messages on the unit 18 if the program signal carries the appropriate auxiliary signals containing display messages with it.

The order calling procedure of this system can be
35 used to poll subscribers to obtain their answers to questions appearing on the display 42 of the unit 18 or presented in a program being viewed.

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The system 10 above is one specific example of the present invention. It will be evident from the various observations below that a person of ordinary skill in the art may make many modifications in the system 10 without departing from the spirit of the invention.

5 The program signal is not limited to one of a particular frequency or carried by a particular medium. It may be a television, radio, or other frequency signal. The enciphering scheme may take any appropriate form which is
10 suitable for the transmission of a separate deciphering key in the form of an electronically transmitted message capable of being stored in the subscriber unit. The program signal need be accompanied only by a control signal for activating the deciphering. The display data signal is
15 optional. The accompanying control signal may be transmitted to the subscriber unit in any suitable form so long as it bears an appropriate time relationship with the program signal to permit the activation of the deciphering contemporaneously with the starting period of the program.
20 While it is convenient to carry the control signal on the same channel with the program signal, this is not essential, and the control signal can be supplied by other carrier means if that is preferable.

25 The mass announcement distribution feature of the system 10 is described because such a feature is presently in operation in the telephone system of the United States. Any telecommunications network feature which is capable of responding to an order call with a deciphering key and of doing so in a short enough time to meet the demand for
30 program orders to an acceptable degree would be suitable. For example, an electronically programmable private branch exchange (PBX) can be adapted to perform such a function.

35 The manual lock on the subscriber unit can deny program orders while neither denying viewing nor canceling orders already placed. Under certain circumstances it may be desirable to equip the subscriber unit with a mechanism for disabling the ordering capability if the unit senses

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that the program signal from the program channel is too weak to yield an acceptable rendition of the program or would be likely to result in errors in the control signals.

The unit may also include a memory for recording the
5 lengths of time that an unsatisfactory signal is received. This information can be automatically accessed at a future time and used by the television network to control future ordering or possibly as the basis for a refund.

The information for display can appear on the
10 television screen in the "caption" area at the top or bottom of the screen instead of on the subscriber unit. The display on the unit or otherwise external of the television picture can take various forms. It may, for example, be by a printing mechanism connected to the
15 subscriber unit as slave.

The memory or the subscriber unit is preferably of the type which retains stored information without external power. This permits a subscriber unit to be provided with deciphering key information and then transported to another
20 location for receiving the program. This would make possible the renting of such units already provided with the key information for a given time or program.

The connection of the subscriber unit to the telephone service can be adapted to be cordless. Also, the
25 unit may be provided with a handset and dial mechanism for use as a telephone.

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Claims

1. Electronic apparatus of the type comprising:
a program receiver for receiving a program signal
in an enciphered form from a signal carrier;
5 a decipherer for selectively deciphering the
program signal and sending it to a receiver, and
a controller for controlling the activation of the
decipherer:
a subscriber unit externally operable for
10 receiving a program order;
CHARACTERIZED BY
a system for storing the program order;
a switch connected to a telephone line for
automatically calling an order to a service number in
15 response to the program order, and
a memory for automatically receiving and storing
deciphering information delivered through the telephone
line in response to the order calling for the program to
permit the controller to initiate deciphering,
20 said controller being responsive to control
signals delivered with said program signals.
2. The apparatus in accordance with claim 1,
CHARACTERIZED BY
a decipherer responsive to a control signal also
25 delivered by the program signal carrier for enabling the
switch.
3. The apparatus in accordance with claim 2,
CHARACTERIZED BY
a display for displaying information delivered by
30 the control signal for providing program and other
information to the user.
4. The apparatus in accordance with claim 3,
CHARACTERIZED BY
a channel selector for selecting among different
35 channels of program signals delivered by the program signal
carrier.
5. The apparatus in accordance with claim 4,

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CHARACTERIZED BY

an auxiliary signal for selectively permitting a nonenciphered program signal to bypass the deciphering means.

5 6. The apparatus defined in claim 5,

CHARACTERIZED BY

an internal key decipherer operable to decipher certain predetermined program signal channels of the incoming program signals.

10 7. The apparatus defined in claim 6,

CHARACTERIZED BY

separately operable program order means, program order storing means, deciphering storing means, and deciphering activating means individually associated with 15 each channel and capable of at least two different order calling telephone numbers.

8. The apparatus defined in claim 7,

CHARACTERIZED BY

a detector for preventing the ordering of a 20 program signal which is determined to be too weak to be properly received.

9. The apparatus defined in claim 8,

CHARACTERIZED IN THAT

the display is alphanumeric.

25 10. A method of controlling the deciphering of an enciphered signal,

CHARACTERIZED BY

the steps of receiving an order call from a subscriber unit via a telephone line, and

30 responding thereto by sending back on that line the deciphering key information for storage in that unit without requiring the subscriber unit to identify itself.

11. The method of claim 10,

CHARACTERIZED IN THAT

35 the responding includes sending control signals to the unit along with the deciphering key information.

12. The method of claim 11,

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CHARACTERIZED IN THAT

the responding includes sending data signals to the unit along with the deciphering key information, the data signals being adapted for addressing a display at the 5 subscriber location.

13. The method of claim 10,

CHARACTERIZED BY

sending first control signals to the subscriber unit contemporaneously with the enciphered signal for 10 determining the enabling of deciphering apparatus of the subscriber unit.

14. The method of claim 13 comprising sending second control signals to the subscriber unit independently of said responding signal for controlling the enabling of 15 the order calling equipment of the unit.

15. The method of claim 14 wherein said second control signals accompany the enciphered signals on the same carrier.

16. The method of claim 14 comprising sending 20 display information along with at least one of said first and said second control signals for display at the subscriber location.

17. A system for controlling the access of a subscriber to a signal, comprising:

25 means for enciphering the signal and transmitting it to a subscriber deciphering unit;

telephone means connected to the subscriber unit and adapted to receive program order calls from the unit and to respond to the orders by sending to the unit over 30 the telephone means the key information necessary for the unit to decipher the signal if enabled, and

means for sending a first control signal to the unit along with the program signal, said first control signal being adapted to enable the unit for deciphering the 35 program signal.

18. The system defined in claim 17 comprising means for sending second control signals to the unit along

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with the key information over the telephone means.

19. The system defined in claim 18 comprising means for sending display data along with at least one of said first and second control signals.

5 20. The system defined in claim 17 wherein said first control signals include signals for enabling the order calling of the subscriber unit.

10 21. The system defined in claim 20 comprising means responsive to the number of order calls received from subscriber units for determining the enabling of the order calling of the remaining subscriber units by means of the first control signals.

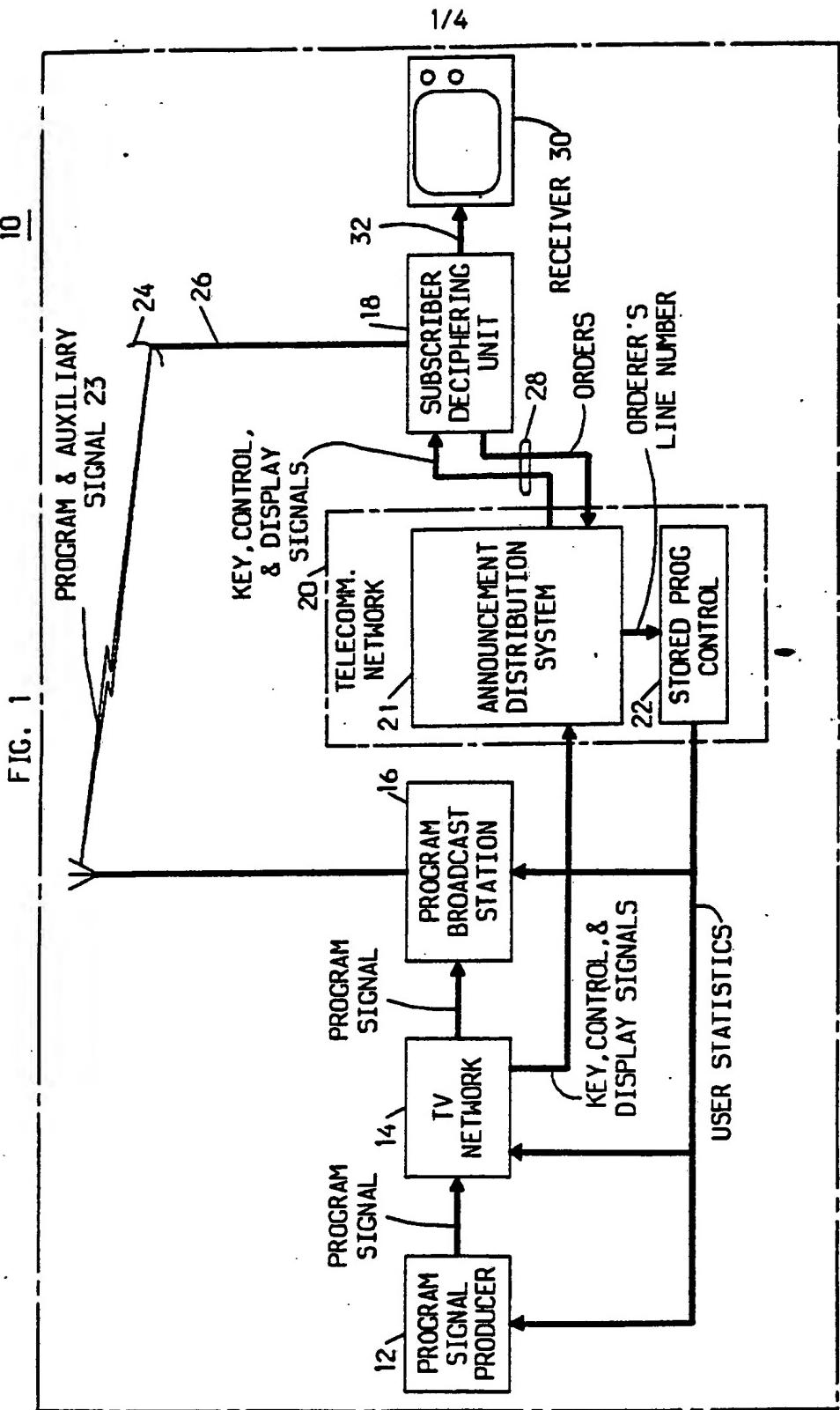
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FIG. 2

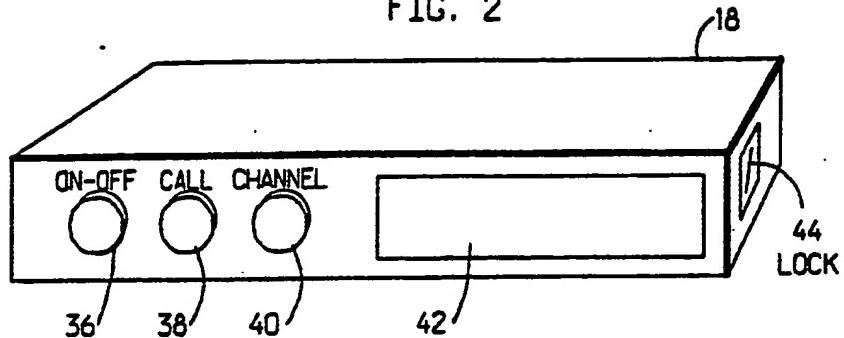


FIG. 3

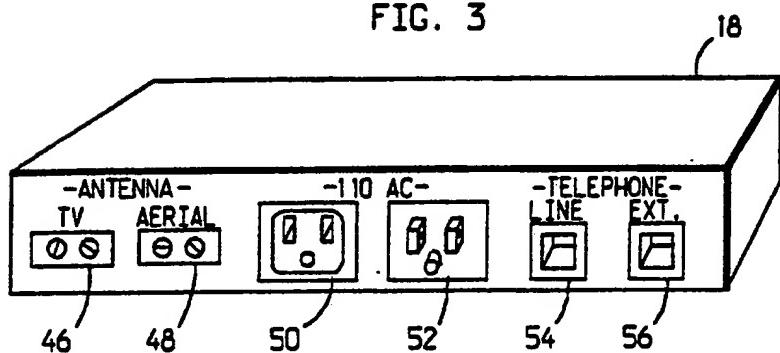
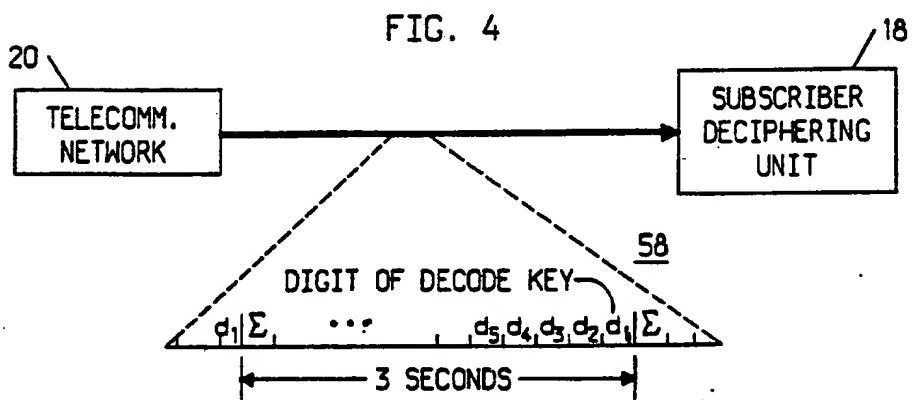
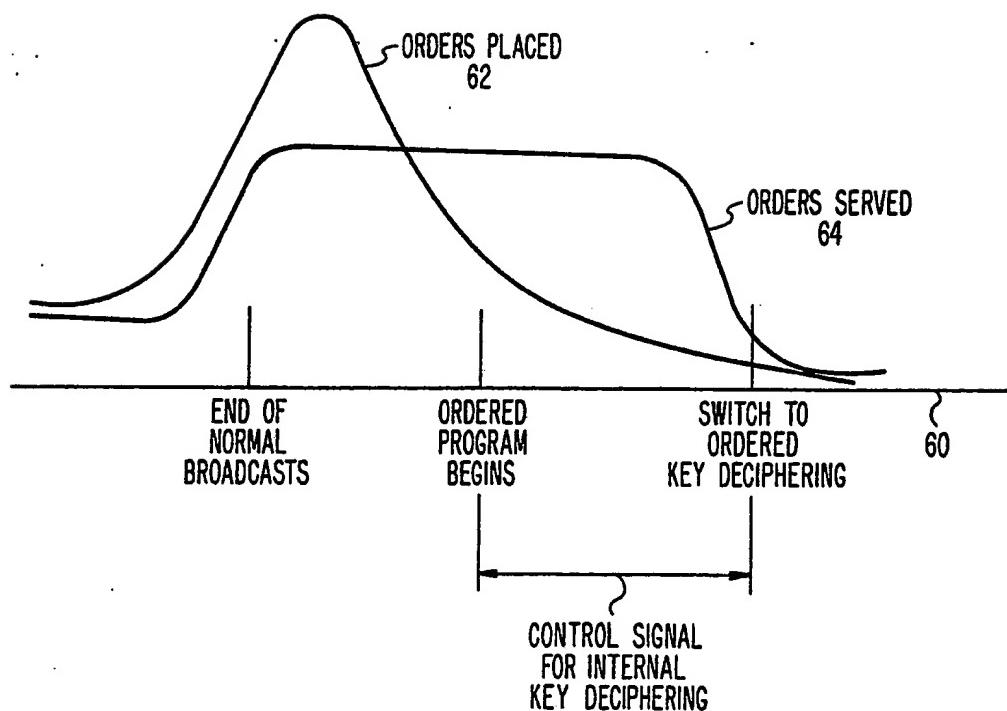


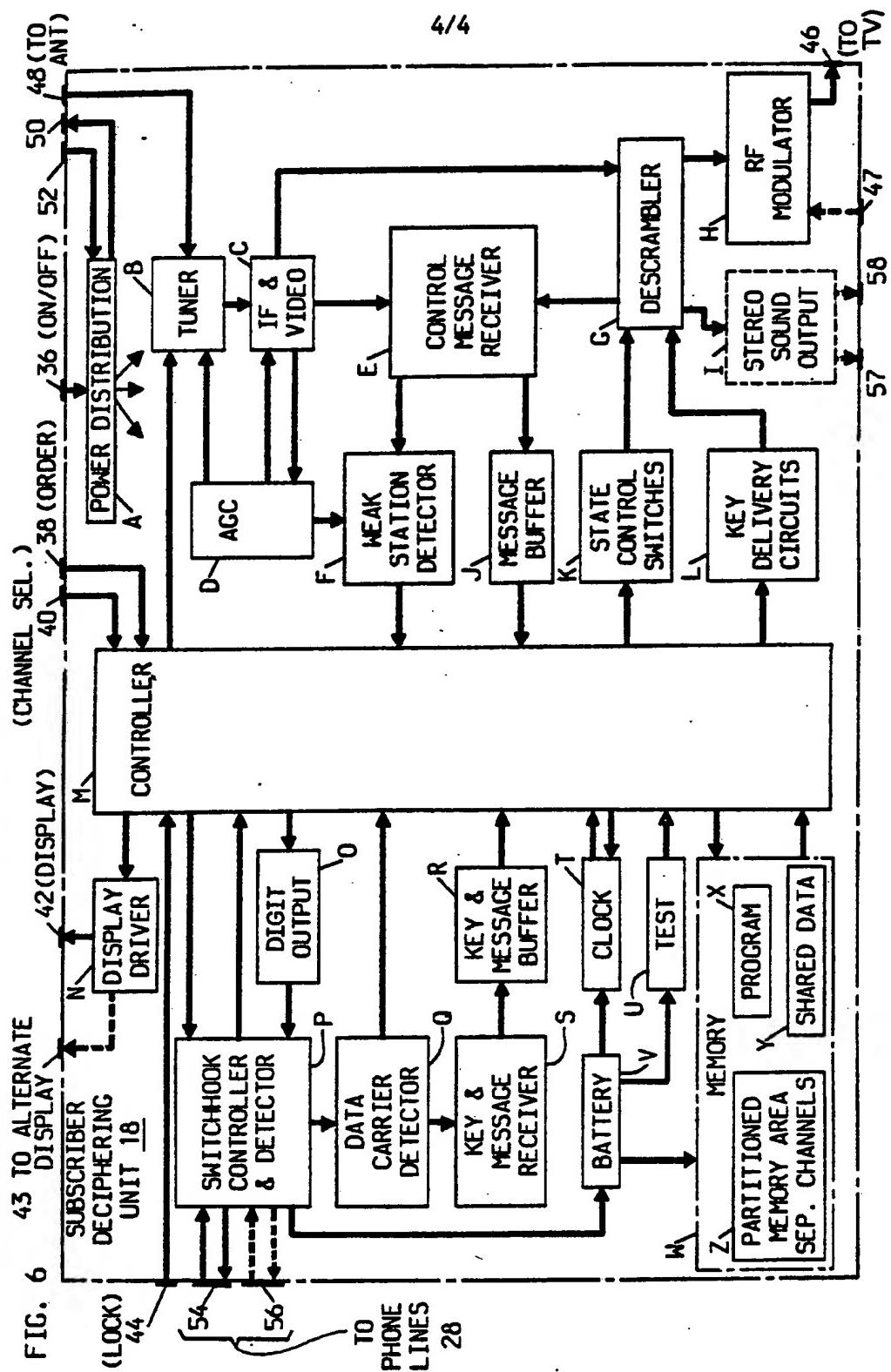
FIG. 4



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FIG. 5





INTERNATIONAL SEARCH REPORT

International Application No PCT/US85/00132

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) *

According to International Patent Classification (IPC) or to both National Classification and IPC
INT. CL.3 H04N 7/16; H04K 1/04
U.S. CL. 358/122; 358/114; 358/85; 358/116

II. FIELDS SEARCHED

Minimum Documentation Searched *

Classification System	Classification Symbols
U.S.	358/85, 114, 116, 122

Documentation Searched other than Minimum Documentation
to the Extent that such Documents are Included in the Fields Searched *

III. DOCUMENTS CONSIDERED TO BE RELEVANT **

Category *	Citation of Document, ¹⁶ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸
X, Y	US, A, 4,225,884, (BLOCK ET AL.) 30 September 1980	1-21
Y, P	US, A, 4,456,925 (SKERLOS ET AL.) 26 June 1984	3, 7, 9, 12, 16, 19
A	US, A, 4,163,254 (BLOCK ET AL.) 31 July 1979	1-21
A	US, A, 4,115,807 (PIRES) 19 September 1978	1
Y	US, A, 4,205,343 (BARRETT) 27 May 1980	3, 12, 16, 19
A	US, A, 4,163,255 (PIRES) 31 July 1979	1

* Special categories of cited documents: ¹⁵

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search ¹⁹

10 April 1985

Date of Mailing of this International Search Report ²⁰

16 APR 1985

International Searching Authority ²¹

ISA/US

Signature of Authorized Officer ²²

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